Key Determinants of Economic Incentives and Institutional Regimes to Promote Knowledge-based Economy in East Asia

DEBNATH, Sajit Chandra*

Abstract

It is now well established that knowledge created through innovation and technological progress is the long-term driver of economic growth. The fundamental challenge in an emerging knowledge-based economy is to harness knowledge for development by providing an enabling environment of competitive education system and highly qualified human resources, excellent information and communication technology infrastructure (ICT) and innovation infrastructure. Science and technology are at the heart of knowledge-based economic growth and development. Identifying the factors, policies and institutional arrangements that promote technology diffusion is the first step in ensuring a country to secure access to and use of technologies developed by technology leaders. As such, it is needless to say that the whole process of knowledge creation and diffusion in a knowledge-based economy heavily depends on appropriate government policies that are usually the outcome of economic incentives and institutional regimes. Many East Asian governments have shown remarkable success in creating a knowledge-based economy by pursuing appropriate policies. This paper attempts to identify the key determinants of economic incentives and institutional regimes to promote knowledge-based economy in East Asia.

RITSUMEIKAN INTERNATIONAL AFFAIRS Vol.10, pp.183-218 (2011).

* Correspondence to: Dr. Sajit Chandra Debnath, Assistant Professor, College of Business Administration, Ritsumeikan University, 1-1-1 Noji-higashi, Kusatsu-shi, Shiga-ken, 525-8577 Japan, E-mail: sajitdeb@fc.ritsumei.ac.jp

Keywords:

Economic Incentives, Institutional Regimes, Good governance, Knowledge-based Economy, Japan, Korea, Taiwan, Hong Kong and Singapore

1. OVERVIEW

It is now well established that knowledge created through innovation and technological progress is the long-term driver of economic growth. In an emerging global knowledge-based economy fuelled by the fast pace of human capital development through creating excellent education and training sectors and the development of the enabling environment for highly qualified human resources through technological innovation, it is important for any country to lay solid foundations for building self-capability to acquire and create knowledge by acquiring, creating and using new and dynamic technology for innovation. This would ensure the appropriate exploitation of the opportunities offered by globalization, and at the same time, help meeting the rising challenges of an emerging global knowledge-based economy.

The fundamental challenge in an emerging knowledge-based economy is to harness knowledge for development by providing an enabling environment of competitive education system and highly qualified human resources, excellent information and communication technology infrastructure (ICT) and innovation infrastructure. Science and technology are at the heart of knowledge-based economic growth and development. However, diffusion and transfer of technology for economic development is not straightforward. Identifying the factors, policies and institutional arrangements that promote technology diffusion is the first step in ensuring a country to secure access to and use of technologies developed by technology leaders. As such, it is needless to say that the whole process of knowledge creation and diffusion in a knowledge-based economy heavily depends on appropriate government policies that are usually the outcome of economic incentives and institutional regimes. Many East Asian governments have shown remarkable success in creating knowledge-based economy by pursuing appropriate policies. In this regard, governments play a very crucial role, because knowledge creation and diffusion cannot simply

depend on market mechanisms alone. An appropriate framework of economic incentives and institutional regimes is necessary for facilitating the interaction among different sectors in a knowledge-based economy. This paper attempts to identify the key determinants of economic incentives and institutional regimes to promote a knowledge-based economy in East Asia.

After the Second World War the government of Japan had shown great success in attracting large amount of FDI to enhance economic growth. During the high growth era of 1970s and 1980s, Japanese government policies enabled the transformation of Japanese economy into a knowledge-based economy. The efforts by the government were fully paid off as Japan gradually became world's second largest economy after the U.S. Following the similar foot step, the governments of other East Asian Economies have shown remarkable success in creating a knowledge-based economy by introducing various economic incentives and by bringing in instrumental changes in institutional regimes. Korea, Taiwan, Hong Kong and Singapore had been tremendously successful in the regard. Malaysia and China have also shown great success in this regard as late comer in the region. Consequently, this study focuses on Japan, Korea, Taiwan, Hong Kong, Singapore, Malaysia and China to investigate the key determinants of economic incentives and institutional regimes to promote knowledge-based economy in East Asia.

2. Understanding the Knowledge-based Economy

The capacity to generate and apply knowledge efficiently has been a tool of innovation, competition and economic success since the old days (Knowledge Economy Forum, 2002: 4). However, classical economic theories failed to consider knowledge as an important input of productivity function of an economy although this has been a very important force of economic and social development for any country. However, many recent scholars have argued for the knowledge as an important input of knowledge-based economy by recognizing its contribution to the overall economic and social development. In an increasingly globalized world, the physical barriers such as distance or geographical disadvantages are becoming narrower; the knowledge becomes more and more important to competitiveness both locally and globally. As the knowledge flows both vertically and horizontal-

ly, it creates better fit between research and development (R&D) and downstream innovation and thereby increases the rate of innovation.

The Knowledge Economy Forum (2002) organized by World Bank has mentioned the following contemporary aspects to understand the knowledge-based economy from broader perspective:

> "The increase in global trade and foreign direct investment in recent years, itself facilitated by the ease of information flows, accelerates the impact of these changes. In an increasingly global economy, where knowledge about how to excel competitively and information about who excels are both more readily available, the effective creation, use and dissemination of knowledge is increasingly the key to success, and thus to sustainable economic and social development that benefits all. Innovation, which fuels new job creation and economic growth, is quickly becoming the key factor in global competitiveness.
>
> The impact of global information flows, and of the knowledge economy, on governmental and societal institutions is no less profound or important. In information-rich environments where knowledge flows freely and communications are abundant and multi-directional, pressures increase on governments to be more transparent, accountable and participatory. At the same time, the ability of governments to access and control information, and the uneven access to information and knowledge among sectors of society can, in certain circumstances, increase inequality and further entrench existing political and social elites. Unequal access to education and training can perpetuate and deepen inequality.
>
> The growth of a global knowledge-based economy creates great opportunities, and poses great challenges, for all countries, but particularly for those that are still struggling to combat widespread poverty and create sustainable development that reaches all, or those dealing with difficult transitions from centralized forms of economic organization. To create these opportunities and navigate these risks, a country must do three difficult things. It must develop a coherent, multi-faceted national strategy for building and sustaining a knowledge-based economy. It must develop this strategy in a participatory, broad-based fash-

> ion that includes and empowers all major sectors of society, including the private sector, educators, scientists and innovators, civil society, the media and others. And it must implement this strategy in a sustained and patient fashion, carefully balancing competing priorities, difficult tradeoffs, and interdependent changes with different time horizons, all in the context of opening progressively to a fast-paced, rapidly changing, unpredictable and highly competitive global economy."
>
> Knowledge Economy Forum (2002:4-5)

The Knowledge Economy Forum (2002:5-6) also recognized four essential dynamics for building a knowledge-based economy such as:

1. *Creating an appropriate economic incentive and institutional regime* that encourages the widespread and efficient use of local and global knowledge in all sectors of the economy, that fosters entrepreneurship, and that permits and supports the economic and social transformations engendered by the knowledge revolution;
2. *Creating a society of skilled, flexible and creative people*, with opportunities for quality education and life-long learning available to all, and a flexible and appropriate mix of public and private funding;
3. *Building a dynamic information infrastructure*, and a competitive and innovative information sector of the economy that fosters a variety of efficient and competitive information and communications services and tools available to all sectors of society. This includes not only "high-end" information and communication technologies (ICTs) such as the Internet and mobile telephony but also other elements of an information-rich society such as radio, television and other media, computers and other devices for storing, processing and using information, and a range of communication services.
4. *Creating an efficient innovation system* comprising firms, science and research centers, universities, think tanks and other organizations that can tap into and contribute to the growing stock of global knowledge, adapt it to local needs, and use it to create new products, services, and ways of doing business. Designing and implementing a coherent and sustained response to these challenges is not easy, particularly for developing countries and countries in transition, which face additional burdens from limited resources,

weak institutional capacity, and a legacy of centrally-controlled economic development.

The various contemporary aspects of knowledge-based economy mentioned by the Knowledge Economy Forum provides us with the overall understanding of various factors that are contributing to the development of knowledge-based economy while four essential dynamics portrait the basic skeleton of a knowledge-based economy. In the absence of a universal definition, the above factors mentioned by the Knowledge Economy Forum (2002) help us to understand the basic mechanism of knowledge-based economy in the contemporary world. For this study, we investigated the key determinants of economic incentives and institutional regimes to promote knowledge-based economy in East Asia.

3. FUNCTIONALITY IN A KNOWLEDGE-BASED ECONOMIC SYSTEM

The emergence of the knowledge-based economy reinforces the capacity of the economic system to develop solutions through continuous innovations. In a knowledge-based economy, future-oriented planning are considered more important than current trends in the market because institutions and markets usually develop historically whereas the knowledge-based structure of expectations functions in an anticipatory mode (Leydesdorff, 2005:25). The dynamics of innovations in a knowledge-based economy are, thus, non-linear (Leydesdorff, 2005). Such non-linearity is the natural consequence of complex interaction of different subdynamics in a knowledge-based economy.

Although, historically, interactions among the subdynamics were first enhanced by the national proximity, the dynamic scale effects through innovations became more important than static ones as the economic and technological dimensions are globalized and this was first realized by the multinational corporations which later became the concern of the governments in advanced, industrialized countries after the global oil crisis in the 1970s (Galbraith, 1967; Brusoni *et al.,* 2000 and OECD, 1980). Creating a functional knowledge-based economy became priority of these countries as they were recognizing the knowledge-based innovations as the main driver of their economic growth (Freeman, 1982 and Irvine and Martin, 1984). Globalization induces an oscillation to the nation states to use

their resources for the continuation of an 'endless transition' through knowledge creation and diffusion to compete in a global knowledge-based economy whereby, in many cases, the institutional make-ups of the nation states must get restructured (Etzkowitz and Leydesdorff, 1998).

The creation and diffusion of knowledge in a knowledge-based economy does not have a single frame of reference yet (Leydesdorff, 2005:29) and thus the governance or making up of a knowledge-based economy can only be based on a set of assumptions about the relevant systems and as such, this research investigated the determinants of economic incentives and institutional regimes of the knowledge-based economy in East Asia to understand its governance to promote knowledge-based economy in the region.

4. The Economic Incentives in East Asian Knowledge-based Economies

The appropriate economic incentives are very crucial to the growth of knowledge-based economy. Without appropriate economic incentives, it is difficult to foster growth in a knowledge-based economy. Openness towards trade (Chen and Dahlman, 2005), stable financial and monetary systems that allow minimal price distortions and create sound investment opportunities (Heritage foundation, 2009), competitive business and investment environments and presence of appropriate property rights legal system are some of the main factors of the economic incentives that encourage entrepreneurships and competition which ultimately lead to continuous innovation in the knowledge-based economic growth.

Openness

Openness reflects the openness of an economy to imports of goods and services from around the world and the ability of citizens to interact freely as buyers and sellers in the international marketplace (Heritage Foundation, 2009: 13). In most of the East Asian knowledge-based economies, the presence of greater trade freedom has been contributing to their high growth for couple of decades. The weighted average tariff rate in Japan and Korea was 1.5 percent and 7.4 percent in 2006 respectively. Import and export restrictions, import quotas, services market access barriers, non-transparent and burdensome regulations and standards, restrictive sanitary and

phytosanitary rules, state trade in some goods, subsidies, and inefficient customs administration add to the cost of trade in Japan while in Korea, prohibitive tariffs, import restrictions, quantitative restrictions, services market access barriers, some import taxes, use of "adjustment" tariffs and taxes to increase import costs, burdensome and non-transparent standards and regulations, weak enforcement of intellectual property rights, and subsidies add to the cost of trade (Heritage Foundation Online, 2009). Japan and Korea have less trade freedom than that of Hong Kong and Taiwan (See Figure 1).

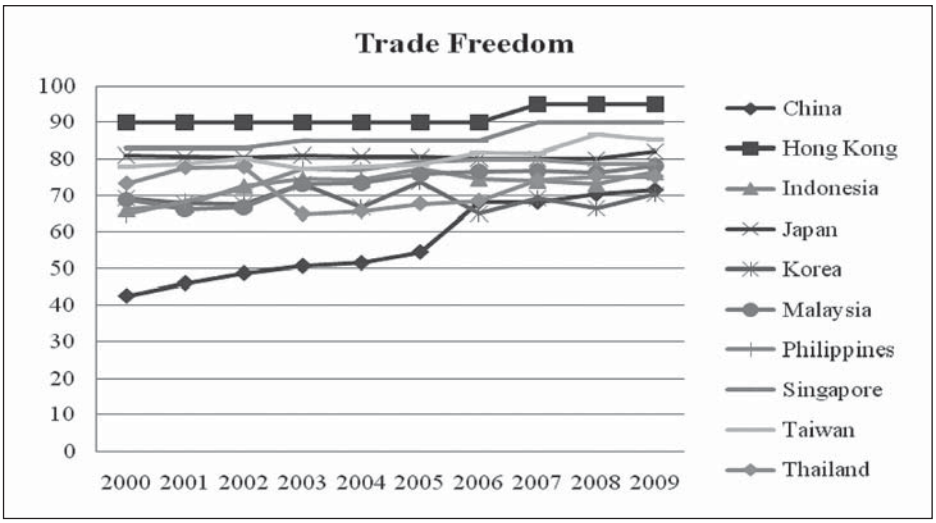


Figure 1: Tariff & Nontariff Barriers, East Asia
Source: The Heritage Foundation's Trade Freedom score, 2009.

Taiwan's weighted average tariff rate was 2.4 percent in 2006. The government has been improving the trade regime, but import and export bans and restrictions, services market access barriers, import taxes and fees, burdensome standards and certification requirements, restrictive pharmaceutical regulations, cumbersome sanitary and phytosanitary rules, state trade in rice, and weak enforcement of intellectual property rights add to the cost of trade. Weighted average tariff rate in Hong Kong and Singapore was, however, 0 percent in 2006. In Hong Kong, restrictive pharmaceuticals regulation, market access restrictions for some services, limited import licensing, and issues involving the enforcement of intellectual property rights add to the cost of trade, while in Singapore import re-

strictions, services market barriers, import taxes, import licensing, non-transparent regulations, burdensome sanitary and phytosanitary rules, weak enforcement of intellectual property rights, and export incentive programs add to the cost of trade.

Supporting Business Environment

A supporting and pleasant business environment is about an individual's right to create, operate, and close an enterprise easily which does not encourage unnecessary regulatory rules to be barriers to the free conduct of entrepreneurial activities (Heritage Foundation, 2009: 12). The major East Asian knowledge-based economies have been maintaining a pleasant business environment for businesses to flourish and contribute to the economic growth.

In the case of Japan, Korea, Taiwan, Hong Kong, and Singapore, the business environment is regulated through their regulatory system which allows smooth procedures for businesses to open, operate or close. In all these countries, starting a business and obtaining necessary licenses take much less time than the world average. However, Singapore and Hong Kong have relatively better business freedom than that of Japan, Korea and Taiwan (See Figure 2).

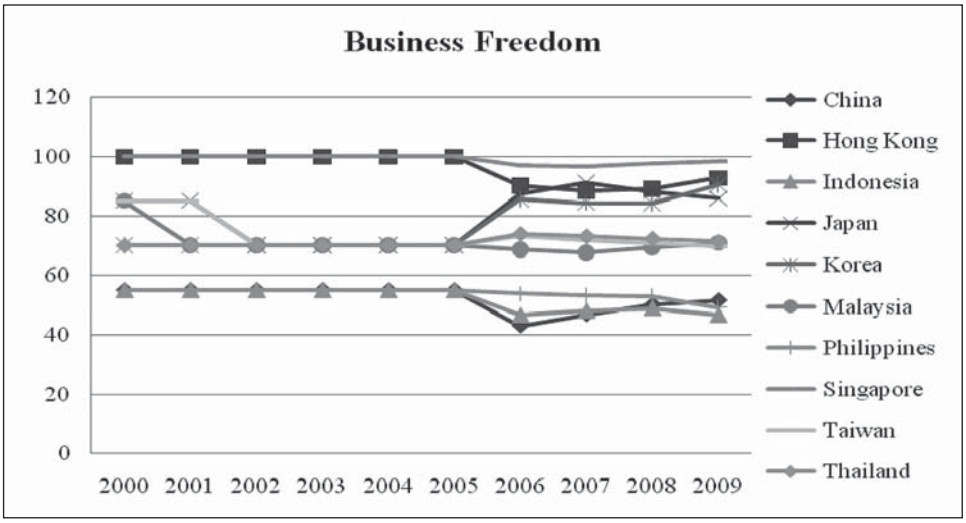


Figure 2: Business Freedom, East Asia
Source: The Heritage Foundation's Trade Freedom score, 2009.

Suitable Investment Environment

In an investment-friendly environment, capital flows to its best use where it is most needed and the returns are greatest and the State plays an important role in facilitating such an investment-friendly environment so that both the investor and the people seeking capital can match easily. The alternative is the lowered entrepreneurial activity that hinders economic growth (Heritage Foundation, 2009: 14). Foreign investment is officially welcomed and inward directed investment is subject to few restrictions in Japan and Korea. There are no controls on the holding of foreign exchange accounts or on transactions, current transfers, repatriation of profits, or real estate transactions by residents or non-residents in Japan, while Korean government offers such incentives as cash grants and zero–corporate tax zones, has a one-stop shop for foreign investments, and assigns an official to facilitate each project, but regulatory administration is still non-transparent and can appear to be arbitrary[1].

In Taiwan, foreign and domestic investments are equal under the law, and private investment is welcomed in most sectors. There are relatively few restrictions on converting or transferring direct investment funds, however, there are quantity restrictions on the level of total outbound investment and investments in China are subject to additional restrictions. In the case of Hong and Singapore, foreign and domestic businesses are treated equally, and nearly all sectors are open to 100 percent foreign ownership and there are no controls or requirements on current transfers, payments, or repatriation of profits[2]. In creating an investment-friendly environment, Hong Kong and Singapore performed better than that of Japan, Korea and Taiwan over the last ten years (See Figure 3).

Functional Monetary System

A good and sound monetary system is necessary for a stable currency and market-determined prices. A stable monetary system with monetary freedom is necessary to create long-term value in the economy. The value of a country's currency is controlled largely by the monetary policy of its government that maintains stability so that inflation cannot distort pric-

1) Heritage Foundation Online, 2009 available at http://www.heritage.org/index/Ranking.aspx
2) Heritage Foundation Online, 2009 available at http://www.heritage.org/index/Ranking.aspx

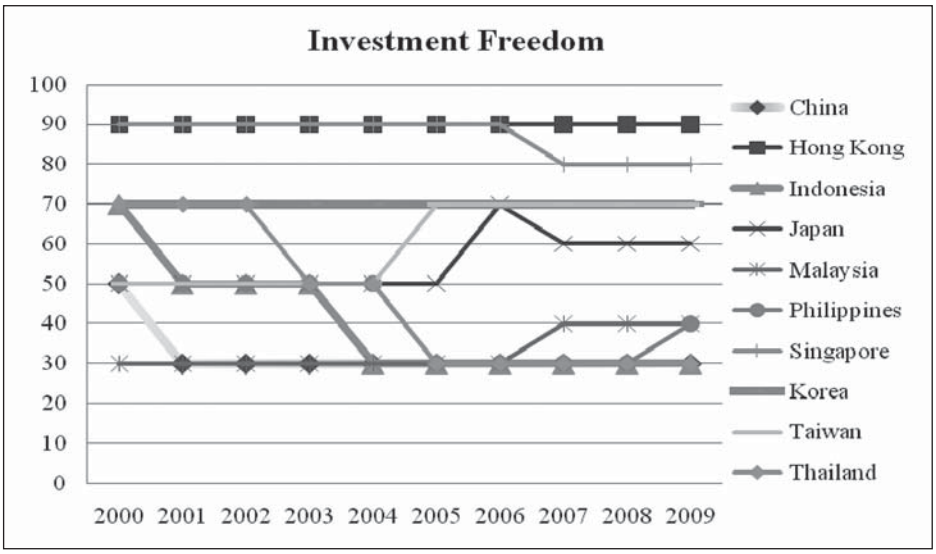


Figure 3: Investment Environment, East Asia
Source: The Heritage Foundation's Investment Freedom score, 2009.

ing, misallocate resources, raise the cost of doing business, and undermine a free society that people can rely on market prices for the foreseeable future (Heritage Foundation, 2009: 14).

Inflation in Japan has been extra ordinarily low, averaging 0.01 percent between 2005 and 2007 while Korea, Taiwan, Hong Kong and Singapore have experienced average inflation rate of 2.5 percent, 1.5 percent, 1.9 percent and 1.7 percent respectively during the same period. According to the Heritage Foundation's Monetary Freedom score, Japan is the leading country in East Asia followed by Singapore, Hong Kong, Taiwan and Korea (See Figure 4).

Sound Financial System

Virtually all countries provide some types of prudential supervision of banks and other financial services for ensuring that financial services firms meet basic fiduciary responsibilities (Heritage Foundation, 2009: 14). Most of the East Asian countries have developed quite strong financial system as they were experiencing high economic growth during the high growth era. Almost all the countries' financial systems are subject to government control to prevent financial disasters that some of the economies experienced during the Asian financial crisis and the current global finan-

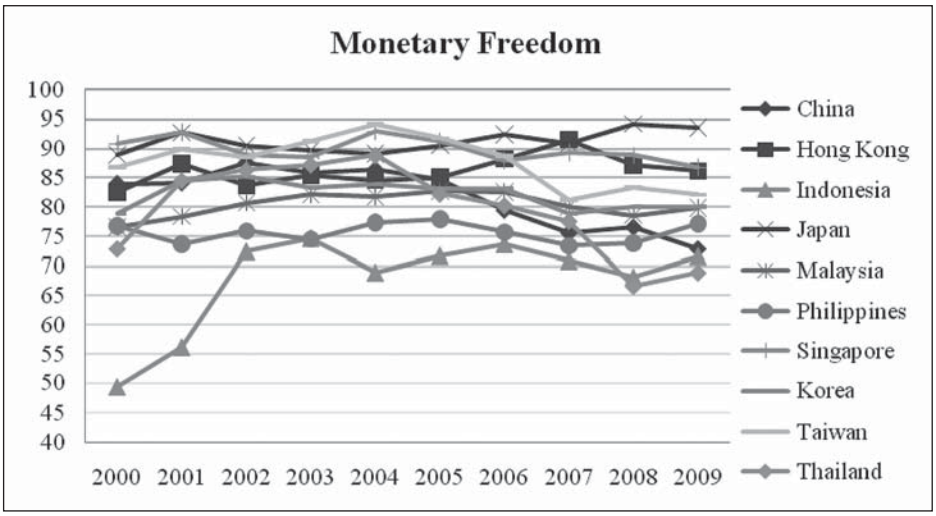


Figure 4: Monetary System, East Asia
Source: The Heritage Foundation's Monetary Freedom score, 2009.

cial crisis. Deregulation and competition in Japan have led to consolidation in an effort to create banks large enough to be major players abroad while the Japanese corporations maintain tight relationships with the banks to have access to cheap credit and lessening accountability. The Japanese government supports bank mergers to speed up the transformation of the financial sector and continues to update laws and regulations to facilitate them.

Korea's modern financial sector has become more open and competitive, providing positive momentum for reforms in other sectors. After the 1997 Asian financial crisis, the government has succeeded in recapitalizing banks and non-bank financial institutions. Taiwan's modern financial sector has become more competitive as many restrictions on financial activities, particularly those of foreign financial institutions, have been reduced while Hong Kong is a global financial center with a regulatory and legal environment focused on enforcing prudent minimum standards and transparency. On the other hand, Singapore's financial sector is also very modern and competitive. Although, the capital market is quite strong in all the selected countries in East Asia, however, the Tokyo Stock Exchange and Hong Kong Stock Exchange (HKSE) are the two of the 10 most capitalized stock exchanges in the world. If we look at the Heritage Foundation's Financial Freedom score which is an indicator of sound financial

system, we see that Hong Kong is the leading center in East Asia (See Figure 5).

Domestic Credit to Private Sector is one of the important components of a sound financial system. In the selected East Asian countries, although there is a negative trend in domestic credit to private sector, however, as compared to the percentage of GDP, they still provide huge domestic credit to the private sector (See Figure 6)

Property Rights Protection

The ability to accumulate private property is the main motivating force in a market economy, and the rule of law is vital to a fully functioning free-market economy (Heritage Foundation, 2009: 14-15).

Secure property rights system that requires an effective and honest judicial system available to all, equally and without discrimination, gives citizens the confidence to undertake commercial activities, save their income, and make long-term plans because they know that their income and savings are safe from expropriation or theft. In most of the selected countries in East Asia, real and intellectual property rights are generally secure. However, in Hong Kong and Singapore, property rights are more strongly protected than that of Japan, Korea and Taiwan (See Figure 7).

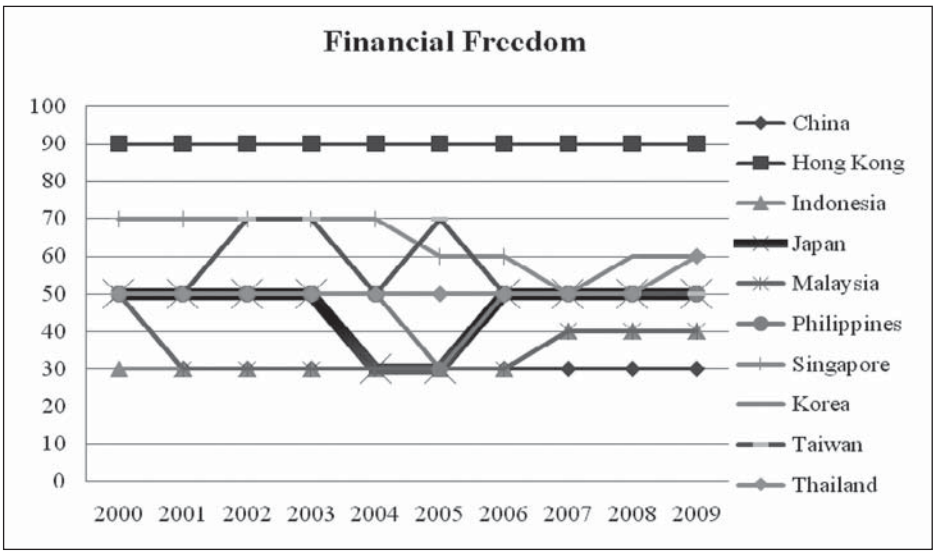


Figure 5: Financial System, East Asia
Source: The Heritage Foundation's Financial Freedom score, 2009.

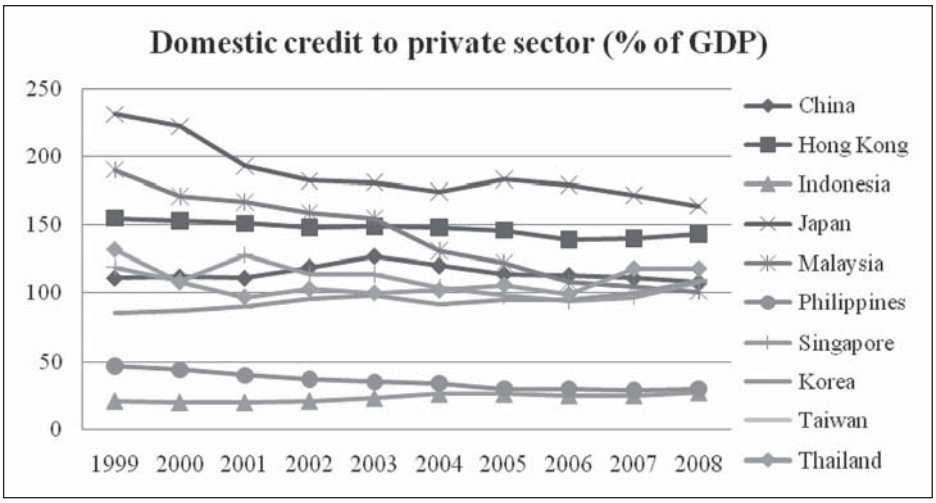


Figure 6: Domestic credit to private sector, East Asia
Source: World Bank, 2009.

Figure 7: Property Rights Protection, East Asia
Source: The Heritage Foundation's Property Rights score, 2009.

5. INSTITUTIONAL REGIMES IN EAST ASIA

An effective, accountable and corrupt-free government and an appropriate legal system that ensures rule of law and efficient regulatory quality are

necessary to support and enforce the basic rule of business to allow fair and competitive business environment for continuous innovations (Chen and Dahlman, 2005: 8-9). Many scholars argued that good governance is absolutely necessary for having a functional institutional regime that would include an effective, impartial and transparent legal system that protects property and individual rights; public institutions that are stable, credible and honest; and government policies that favor free and open markets. In East Asia, these conditions encourage FDI and presumably private domestic investment as well, by protecting privately held assets from arbitrary direct or indirect appropriation. Generally, "good governance" indicators have six dimensions: i) Voice & Accountability, ii) Political Stability, iii) Government Effectiveness, iv) Regulatory Quality, v) Rule of Law, and vi) Control of Corruption (Kaufmann *et al.*, 1999). Using the data from 1996-2008 for the above six indicators, a comparative analysis has been made for selected East Asian countries.

Voice and Accountability

Voice and Accountability is a composite indicator and comprises a number of individual indicators measuring various aspects of the political process, civil liberties and political rights. This index measures the extent to which citizens of a country are able to participate in the selection of governments including measuring the independence of the media, which plays an important role in monitoring those in authority and holding them accountable for their actions. Figure 8 asserts that all the East Asian countries indeed performed much better than China in terms of voice and accountability measures of good governance. This is because all the countries except China are democratic. Being a socialistic country China's performance, in this regard is below 40% in the percentile ranking.

Political Stability

Political Stability index combines several indicators which measure perceptions of the likelihood that the government in power will be destabilized or overthrown by unconstitutional means and/or violent means which may negatively affect the institutional functioning in a country[3)].

3) World Bank KBE online, 2009 available at http://web.worldbank.org/WBSITE/EXTERNAL/WBI/WBIPROGRAMS/KFDLP/EXTUNIKAM/0,,contentMDK:20584288~menuPK:1433258~pagePK:64168445~piPK:64168309~theSitePK:1414721,00.html

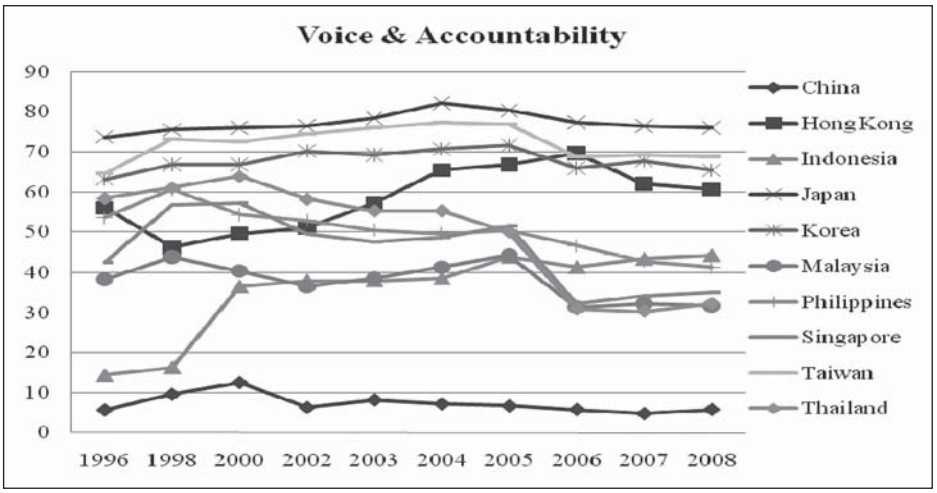


Figure 8: Voice & Accountability, East Asia

Source: Computed data collected from Worldwide Governance Indicators, 1996-2008 available at http://info.worldbank.org/governance/wgi/sc_country.asp.

Figure 9 indicates that almost all East Asian countries have been performing consistently well in terms of political stability. Although China's performance in this regard is below all the other East Asian countries, yet China has been successful in maintaining the political stability around 40% level as shown in the percentile rank.

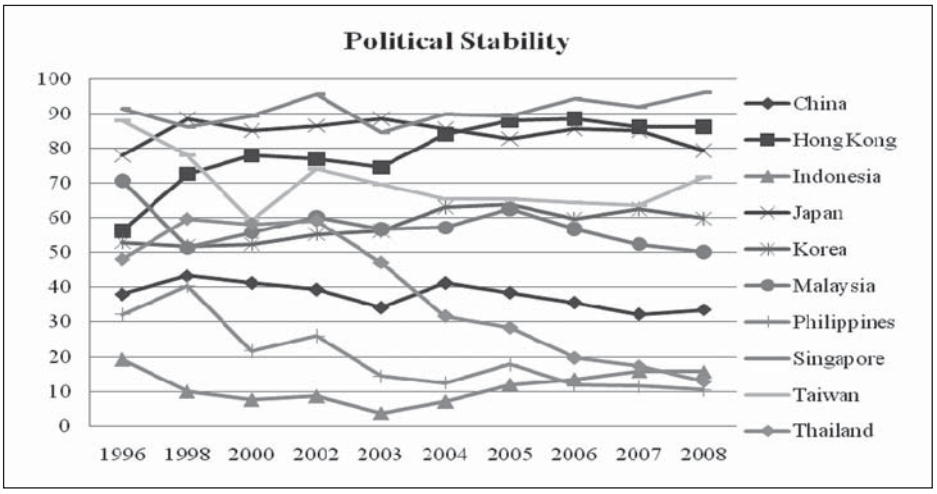


Figure 9: Political Stability, East Asia

Source: Computed data collected from Worldwide Governance Indicators, 1996-2008 available at http://info.worldbank.org/governance/wgi/sc_country.asp.

Government Effectiveness

Government Effectiveness combines into one grouping perceptions of the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies[4]. Figure 10, indicates that all the East Asian countries have been performing consistently well in terms of government's effectiveness. China is performing above 60% level while other East Asian countries' performance in 2007 was above the 80% level in the percentile ranking, which indicates that China's performance in this regard has improved over the last 10 years.

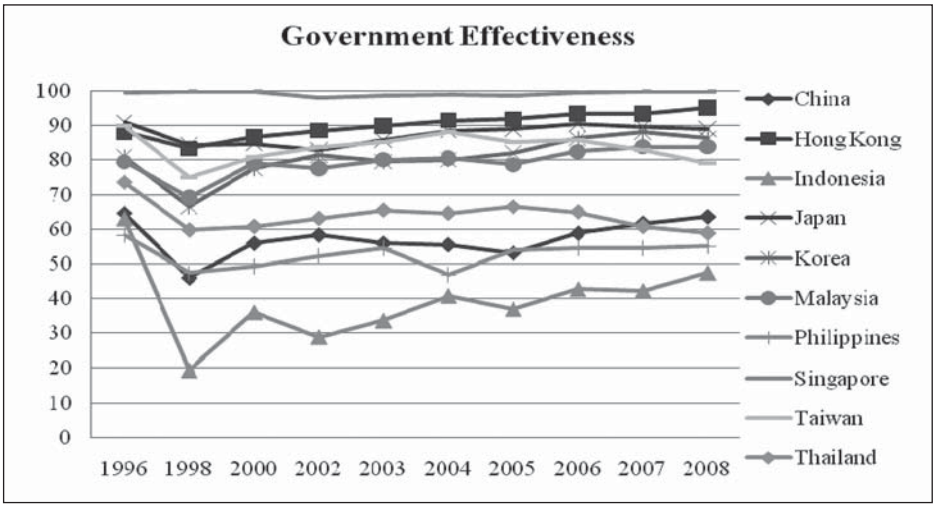


Figure 10: Government Effectiveness, East Asia
Source: Computed data collected from Worldwide Governance Indicators, 1996-2008 available at http://info.worldbank.org/governance/wgi/sc_country.asp.

Regulatory Quality

Regulatory quality measures the incidence of market-unfriendly policies such as price controls or inadequate bank supervision, as well as perceptions of the burdens imposed by excessive regulation in areas such as

4) World Bank KBE online, 2009 available at http://web.worldbank.org/WBSITE/EXTERNAL/WBI/WBIPROGRAMS/KFDLP/EXTUNIKAM/0,,contentMDK:20584288~menuPK:1433258~pagePK:64168445~piPK:64168309~theSitePK:1414721,00.html

foreign trade and business development[5]. Figure 11 shows that regulatory quality in East Asian countries. From the graph, it is evident that all the East Asian countries except China are performing well above the 60% level whereas China is performing above the 40% level in the percentile ranking. However, China's performance has been gradually improving over the years.

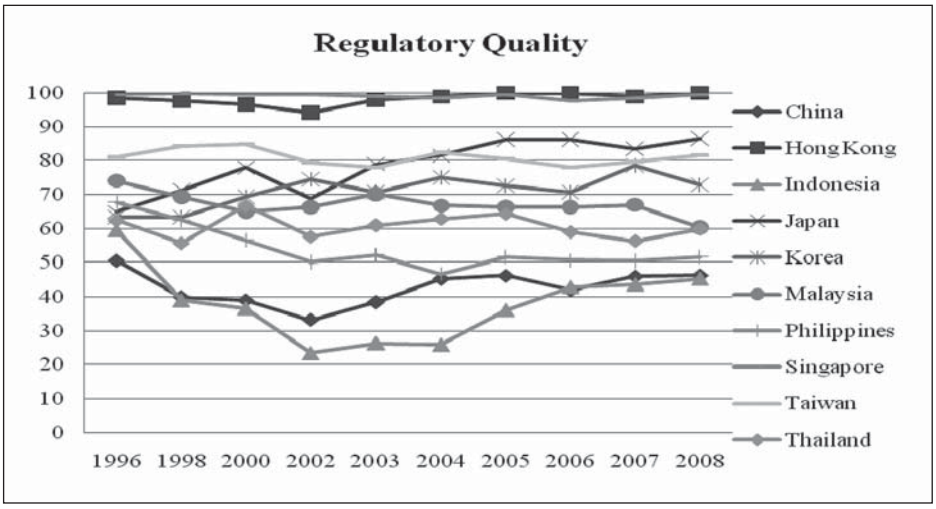


Figure 11: Regulatory Quality, East Asia
Source: Computed data collected from Worldwide Governance Indicators, 1996-2008 available at http://info.worldbank.org/governance/wgi/sc_country.asp.

Rule of Law

Rule of Law includes several indicators which measure the extent to which agents have confidence in and abide by the rules of society and these include perceptions of the incidence of both violent and non-violent crimes, the effectiveness and predictability of the judiciary, and the enforceability of contracts[6]. In terms of rule of law, all the East Asian countries except China are performing well above the 60% level whereas China

5) World Bank KBE online, 2009 available at http://web.worldbank.org/WBSITE/EXTERNAL/WBI/WBIPROGRAMS/KFDLP/EXTUNIKAM/0,,contentMDK:20584288~menuPK:1433258~pagePK:64168445~piPK:64168309~theSitePK:1414721,00.html

6) World Bank KBE online, 2009 available at http://web.worldbank.org/WBSITE/EXTERNAL/WBI/WBIPROGRAMS/KFDLP/EXTUNIKAM/0,,contentMDK:20584288~menuPK:1433258~pagePK:64168445~piPK:64168309~theSitePK:1414721,00.html

is performing above the 40% level in the percentile ranking (See Figure 12). China, although falls behind in this regard, has shown steady development in the last 10 years.

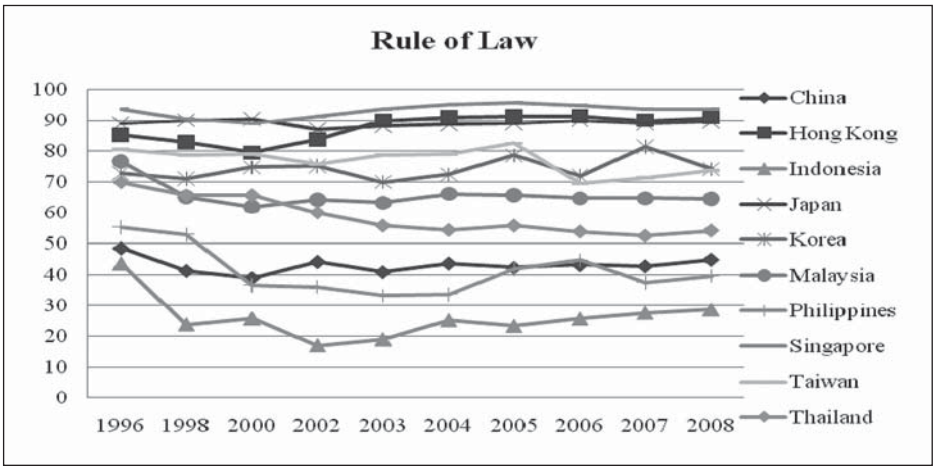


Figure 12: Rule of Law, East Asia

Source: Computed data collected from Worldwide Governance Indicators, 1996-2008 available at http://info.worldbank.org/governance/wgi/sc_country.asp.

Control of Corruption

Control of Corruption indicator corresponds to "graft" measures of corruption, notably, corruption measured by the frequency of "additional payments to get things done" and the effects of corruption on the business environment[7]. From Figure 13, we can note that all the East Asian countries are performing above 60% level in the percentile rank in controlling corruption. Only China has been experiencing poor performance in this regard with the below average level of 50%. China's performance has been declining since 2003.

If we combine all the six indicators of good governance, we will see that Singapore, Hong Kong, Japan, South Korea, Taiwan and Malaysia have been performing well above the 60% level in the percentile ranking which is much better than China. Although China has performed relatively poor in terms of all six indicators compared to the advanced knowledge-

7) World Bank KBE online, 2009 available at http://web.worldbank.org/WBSITE/EXTERNAL/WBI/WBIPROGRAMS/KFDLP/EXTUNIKAM/0,,contentMDK:20584288~menuPK:1433258~pagePK:64168445~piPK:64168309~theSitePK:1414721,00.html

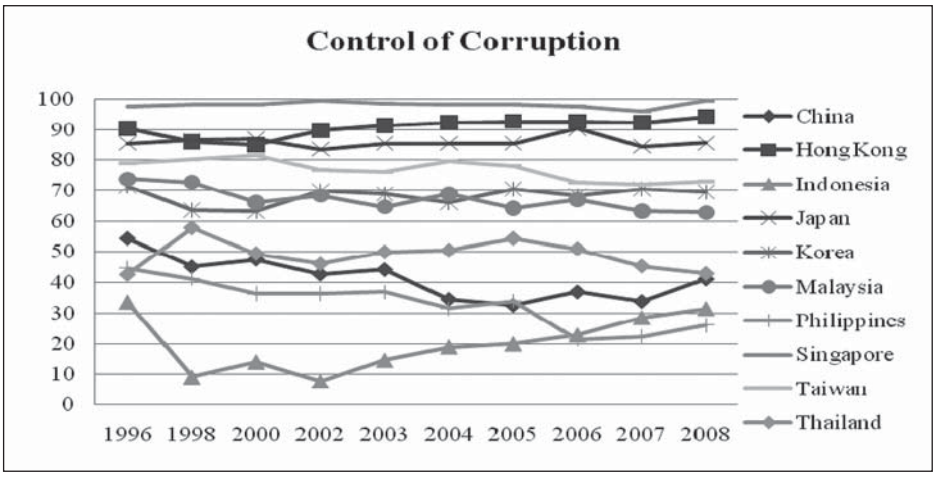


Figure 13: Control of Corruption, East Asia
Source: Computed data collected from Worldwide Governance Indicators, 1996-2008 available at http://info.worldbank.org/governance/wgi/sc_country.asp.

based economies, the country, however, maintained above 40% level on average which is quite significant achievement compared to many other latecomers in the region.

6. The Economic Incentives and Institutional Regimes and Development of Knowledge-based Economy in East Asia

The institutional framework should ensure a good flow of knowledge between scientific research and technological applications, as well as a good flow of information among researchers and users. Here, the governments play a crucial role, as knowledge creation cannot rely on market mechanism alone. As the market for knowledge is often characterized by imperfections – that is to say, social and private returns derived from knowledge can widely differ (UNCTAD, 2007) and in the area of knowledge creation, any 'market failure' may lead to private underinvestment in knowledge. Thus, policies to support knowledge creation through various efforts such as government funding, government procurement, tax subsidies, intellectual property rights protection and so on, as well as knowledge diffusion such as establishment of libraries, communication networks, access cost subsidies, etc. are to be formulated by the government.

As we postulate the role of government as indispensible in creating knowledge-based economy our hypothesis for this study is that economic

incentives and institutional regimes are required for creating knowledge-based economy. While examining how economic incentives and institutional regimes play a role in creating knowledge-based economy, we investigate the determinant factors of economic incentives and institutional regimes that contributed to the growth of knowledge-based economies in East Asia.

Figure 14 shows the relationship among the three components of our study such as economic incentives and institutional regimes, FDI inflows and domestic investments and development of KBE infrastructure. The two black arrows show the first-order development of KBE infrastructure which indicates that economic incentives and institutional regimes lead to attract more FDI and allow more domestic investment to develop KBE infrastructure in the initial stage. Once the first-order development works steadily, the second-order developments take place where all the three interact with each other mutually or independently to improve all the three components to create a complete knowledge-based economy.

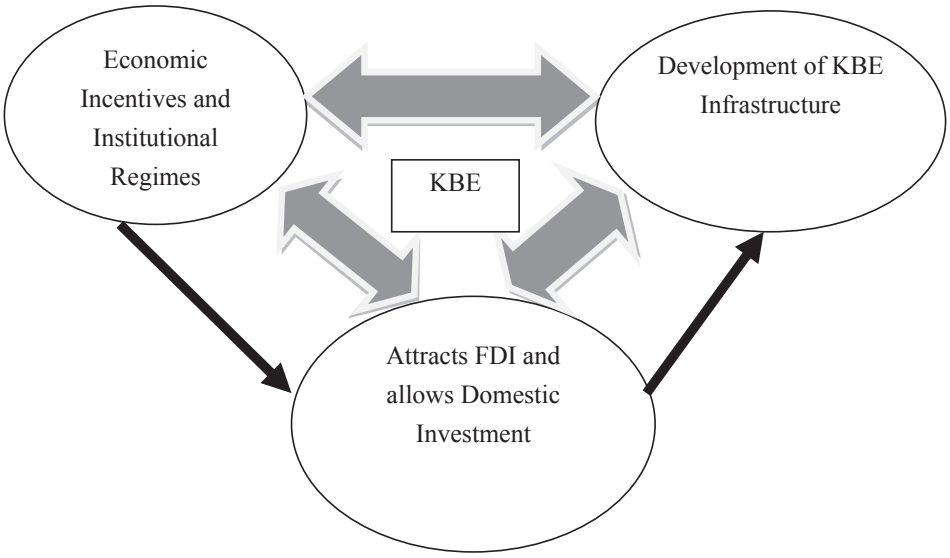


Figure 14: Conceptual Framework of Economic Incentives and Institutional Regimes in the East Knowledge-based Economies
Source: Developed by the author.

7. THE IMPACT OF ECONOMIC INCENTIVES AND INSTITUTIONAL REGIMES IN ATTRACTING FDI TO PROMOTE KNOWLEDGE-BASED ECONOMY IN EAST ASIA

The role of economic incentives and institutional regimes in promoting knowledge-based economy in East Asia has been to attract large volume of FDI and increase domestic investment to build the KBE infrastructure to bring better economic growth. FDI can increase competition in the host economy, making domestic companies more efficient and improving living standards. A recent study found that for 1 percent increase in FDI in developing economies, there will be a GDP per capita growth of about 0.5% (McLean and Shrestha, 2002). Recent available data indicates that all East Asian countries have positive FDI inflows. This indicates that the stable sociopolitical environment in the East Asian countries, a product of good governance is one of the core reasons for the large volume of FDI inflows in East Asian countries compared to South Asia or Africa. On the other hand, the domestic investments in education, Research and Development (R&D) and ICT has been quite steady for most East Asian countries, which indicate that the governments in East Asian countries while attracting more FDI also put efforts to develop knowledge-based economic infrastructures.

Among the selected countries in East Asia, Japan, South Korea, Hong Kong, Singapore, Taiwan, and Malaysia have shown superior performance in maintaining better economic incentives and institutional regimes than China. If we consider the knowledge base of each country which is measured by investments in KBE infrastructures and FDI inflows, we see that the same countries achieved better development in strengthening the knowledge base of their economies in all the other pillars of knowledge-based economy such as education and human resources, innovation infrastructure, and information communication infrastructures.

Now, if we investigate the six good governance indicators further, we will find that Taiwan, Japan, Singapore and Hong Kong are leading while Malaysia has been performing better than China taking the fifth position in all indicators. The positive impact of having good governance has been observed in growth of overall productivity in the East Asian Countries. Overall productivity indicates the steadiness of the economy and the countries that are leading in terms of economic incentives and institutional re-

gimes in East Asia are also leading the economic growth in East Asia.

In terms of FDI inflows, China has shown much better performance than other East Asian countries although FDI has played a major role in advancing all the East Asian Knowledge-based Economies. However, the inward FDI within China flows disproportionately into provinces with less corrupt governments and governments that better protect private property rights. This, therefore, suggests that if China had higher quality governance across all the provinces, the country as a whole would have attracted even more FDI. Among the East Asian countries, China attracts the highest FDI as the country has maintained political and ideological stability with growing wealth. Although China ranks at the bottom in the good governance rankings among the selected East Asian countries, China's success story in attracting FDI is largely attributed to the spectacular growth track record, the relatively better government executive power, a relative political stability, good infrastructure, abundant educated labor force, and its large domestic market. So, China's case is not exceptional in East Asia.

8. Identifying the Contributing Factors of Economic Incentives and Institutional Regimes

From the analysis, it is clear that the creation of knowledge-based economy in East Asia is positively correlated with economic incentives and institutional regimes. In East Asia, good governance played an important role in attracting FDI, which helped developing the knowledge-based economic infrastructures to create knowledge-based economy. In the case of China, the country is still a long way behind the other selected East Asian countries in terms of knowledge-based economy. The same can be said about the overall productivity which is a powerful indicator of economic growth. If China wants to be similar to other East Asian knowledge-based economies, China has to further improve its economic incentives and institutional regimes quality.

From the above discussion and trend analysis of various empirical data of the East Asian countries it is quite evident that advanced knowledge-based economies such as Japan, Korea, Taiwan, Hong Kong and Singapore are highly successful in the development of functional economic incentives and institutional regimes. Openness, supporting business environment, suitable business environment, functional monetary system,

sound financial system, and property rights protection have been the key contributing factors of the economic incentives in the East Asian countries. In terms of institutional regimes, voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption are the key contributing factors identified. These key factors contributed greatly to the development of a functioning economic incentive system and institutional regimes in East Asia.

9. Analysis for Economic Incentives and Institutional Regimes in East Asia

In the earlier section, we discussed on the economic incentives and institutional regimes, one of four pillars of knowledge-based economy. There we found seven factors for economic incentives and six factors for institutional regimes that are contributing to the development of superior economic incentives and institutional regimes in the East Asian economies. Tariff and nontariff barriers, business freedom, investment freedom, monetary system, financial system, domestic credit to private sector, property right protections are the variables; we discussed that function for the economic incentives of a country. On the other hand, good governance indicators such as voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption are core components of any sound institutional regime.

Table 1

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Economic Incentives & Institutional Regimes	10	3.66	9.68	6.36	2.196
Tariff and Nontariff Barriers	10	70.20	95.00	80.22	7.94
Business Freedom	10	46.70	98.30	72.63	18.93
Investment Environment	10	20.00	90.00	52.50	22.64
Monetary System	10	66.40	88.80	76.67	6.72
Financial System	10	30.00	90.00	55.00	17.16
Domestic Credit to Private Sector	9	27.00	164.00	100.89	45.69
Property Right Protection	10	20.00	90.00	57.00	24.97
Voice and Accountability	10	5.80	76.00	46.11	21.51
Political Stability	10	10.50	96.20	51.62	32.02
Government Effectiveness	10	47.40	100.00	75.84	18.28
Regulatory Quality	10	45.40	100.00	70.43	20.75
Rule of Law	10	28.70	93.80	65.42	22.94
Control of Corruption	10	26.10	99.50	62.61	26.23
Valid N (listwise)	9				

As the first step, we have investigated the descriptive statistics to study the minimum, maximum, mean and standard deviation of all variables. Table 1 shows the descriptive statistics of all the variables for economic incentives and institutional regime in East Asia that describes the characteristics of each variable by the measuring the total number of observance, minimum, maximum, mean and standard deviation of each variable.

As for second step, Table 2 shows the correlation of each independent variable with the dependent variable economic incentives and economic regimes. From the correlation analysis, we can see that the dependent variable is not equally significantly associated with all the independent variables. The association of Tariff and nontariff barriers, business freedom, investment environment, monetary system, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption with economic incentives and institutional regimes are highly significant at 0.01 level while the association with financial system, domestic credit to private sector, property right protection and voice and accountability is not statistically so significant.

Table 2

Correlation														
		V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13
Economic Incentive & Institutional Regimes	Pearson Correlation	.847**	.879**	.861**	.798**	.505	.497	.602	.482	.929**	.910**	.986**	.950**	.962**
	Sig. (2-tailed)	.002	.001	.001	.006	.136	.174	.066	.159	.000	.000	.000	.000	.000
	N	10	10	10	10	10	9	10	10	10	10	10	10	10
	**. Correlation is significant at the 0.01 level (2-tailed).													
	*. Correlation is significant at the 0.05 level (2-tailed).													

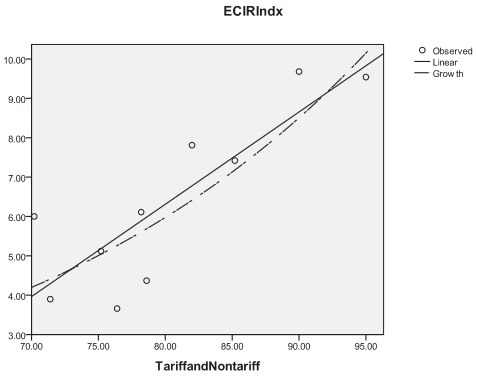
Note: ***V1:*** *Tariff and Nontariff Barriers,* ***V2:*** *Business Freedom,* ***V3:*** *Investment Environment,* ***V4:*** *Monetary System,* ***V5:*** *Financial System,* ***V6:*** *Domestic Credit to private Sector,* ***V7:*** *Property Right Protection,* ***V8:*** *Voice & Accountability,* ***V9:*** *Political Stability,* ***V10:*** *Government Effectiveness,* ***V11:*** *Regulatory Quality,* ***V12:*** *Rule of Law, and* ***V13:*** *Control of Corruption.*

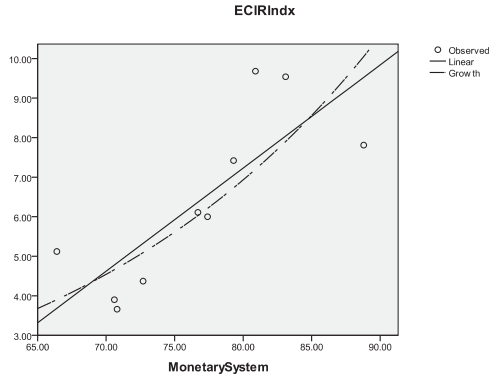
In the third step, we have investigated the curvilinear regression for each statistically significant independent variable against the dependent variable to explore the linear and growth relationship between them. Table 3 provides the model summary and parameter estimates for curvilinear regression while Figure 20 shows the curvilinear regression results in graphs.

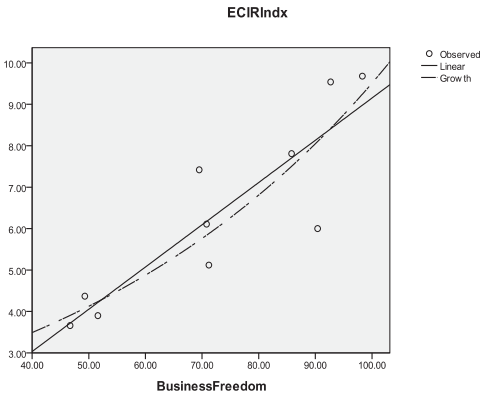
The R square value and the significance level in Table 3 shows that the independent variables that have been explained in section 4 and 5 have close association both in terms of linear and growth with the dependent variable. In Figure 15, these findings are graphically represented.

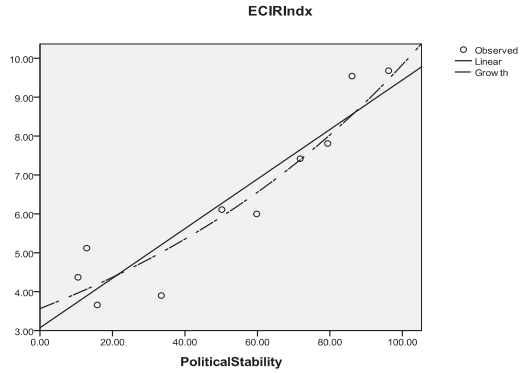
Table 3
Model Summary and Parameter Estimates for Curvilinear Regression

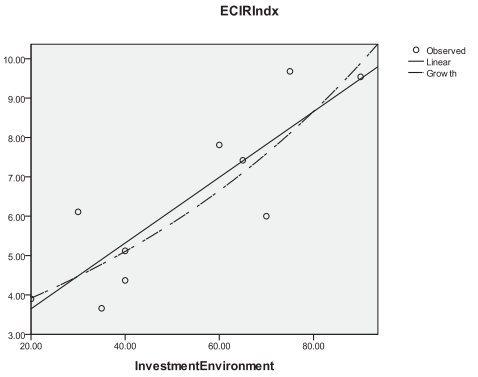
Dependent Variable: Economic Incentives and Institutional Regimes							
	Model Summary					Parameter Estimates	
Equation	R Square	F	df1	df2	Sig.	Constant	b1
The independent variable is Tariff and Nontariff Barrier							
Linear	.718	20.390	1	8	.002	-12.450	.234
Growth	.635	13.899	1	8	.006	-1.038	.035
The independent variable is Business Freedom							
Linear	.773	27.190	1	8	.001	-1.044	.102
Growth	.807	33.500	1	8	.000	.582	.017
The independent variable is Investment Environment							
Linear	.740	22.827	1	8	.001	1.979	.083
Growth	.723	20.918	1	8	.002	1.101	.013
The independent variable is Monetary System							
Linear	.637	14.061	1	8	.006	-13.641	.261
Growth	.651	14.911	1	8	.005	-1.443	.042
The independent variable is Political Stability							
Linear	.863	50.509	1	8	.000	3.072	.064
Growth	.852	46.061	1	8	.000	1.272	.010
The independent variable is Government Effectiveness							
Linear	.828	38.431	1	8	.000	-1.925	.109
Growth	.857	47.882	1	8	.000	.444	.018
The independent variable is Regulatory Quality							
Linear	.972	281.020	1	8	.000	-.988	.104
Growth	.960	191.532	1	8	.000	.625	.017
The independent variable is Rule of Law							
Linear	.902	73.802	1	8	.000	.413	.091
Growth	.939	122.474	1	8	.000	.823	.015
The independent variable is Control of Corruption							
Linear	.925	99.165	1	8	.000	1.319	.081
Growth	.925	99.017	1	8	.000	.987	.013

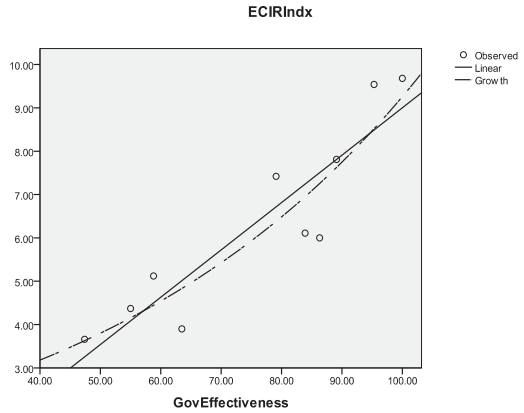

ECIRIndx
Observed
Linear
Grow th
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
70.00
75.00
80.00
85.00
90.00
95.00
TariffandNontariff


ECIRIndx
Observed
Linear
Grow th
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
65.00
70.00
75.00
80.00
85.00
90.00
MonetarySystem


ECIRIndx
Observed
Linear
Grow th
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
BusinessFreedom


ECIRIndx
Observed
Linear
Grow th
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
0.00
20.00
40.00
60.00
80.00
100.00
PoliticalStability


ECIRIndx
Observed
Linear
Grow th
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
20.00
40.00
60.00
80.00
InvestmentEnvironment


ECIRIndx
Observed
Linear
Grow th
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
GovEffectiveness

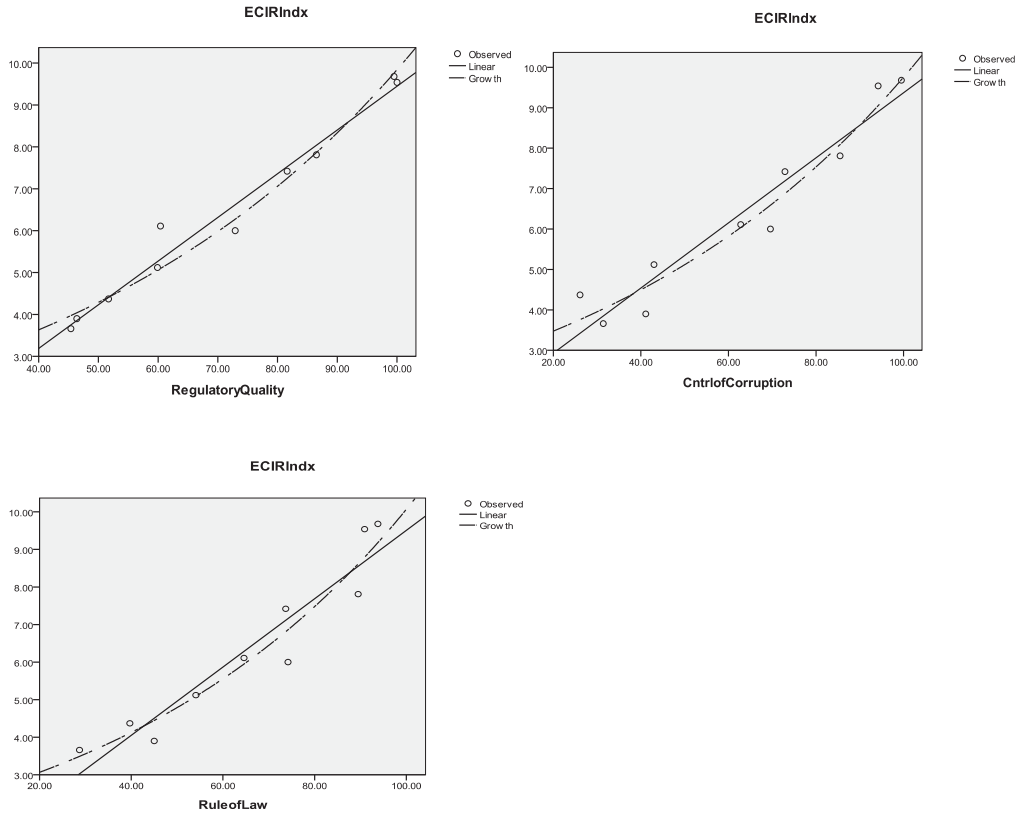


Figure 15: Curvilinear Regression Results

10. Discussion on the Key Determinants of Knowledge-based economy in East Asia

In section 2-6 of this paper, we discussed on how the creation of knowledge-based economy in East Asia is positively correlated with economic incentives and institutional regimes by analyzing various factors of economic incentives and institutional regimes. We found that, in East Asia, good governance played an important role in attracting FDI, which helped developing the knowledge-based economic infrastructures to create knowledge-based economy. Many knowledge-based economies in the region such as Japan, Korea, Taiwan, Hong Kong and Singapore are highly successful in the development of functional economic incentives and institutional regimes. Openness, supporting business environment, suitable business en-

vironment, functional monetary system, sound financial system, and property rights protection have been the key determinants of the economic incentives in the East Asian countries while in terms of institutional regimes, voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption are the key determinants identified. However, from the statistical analysis in section 7, it is evident that not all the factors are equally significant for creating better economic incentives and institutional regimes for a knowledge-based economy. From the statistical analysis we found that some factors such as tariff and nontariff barriers, business freedom, investment environment, monetary system, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption are highly significant at 0.01 level while the other factors such as association with financial system, domestic credit to private sector, property right protection and voice and accountability are not statistically so significant. From discussion in section 2-6 and the quantitative analysis in section 7, we therefore, can argue that tariff and nontariff barriers, business freedom, investment environment, monetary system, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption are the key determinants of economic incentives and institutional regimes in East Asia.

11. A COMPARATIVE LOOK AT WORLD BANK KNOWLEDGE-BASED ECONOMY INDEX FOR EAST ASIA AND FINDINGS OF THIS STUDY

From the empirical data analysis and discussion in section 2-6, we see that Japan, Korea, Taiwan, Hong Kong and Singapore are the most successful countries in East Asia in their pursuit to become a knowledge-based economy in terms of economic incentives and institutional regimes. From analysis and discussion in section 2-6, we realize that foreign direct investment (FDI) has greatly contributed in the initial development of knowledge-based economy in most of the countries in East Asia. Only Japan is exception of this trend. However, Japanese FDI inflow in the other East Asian countries has been one of the very strong forces that contributed to the growth of knowledge-based economy in the region. We discussed many factors for economic incentives and institutional regimes to observe how the factors have been shaping the development of knowledge-based economy in the East Asian economies. After the vivid discussions on vari-

ous factors of economic incentives and institutional regimes of knowledge-based economy in section 2-6, we, then, carried out quantitative analysis in section 7. From the quantitative analysis, we uncovered the key determinants of economic incentives and institutional regimes of knowledge-based economy in East Asia.

To further understand our findings in a more meaningful manner, we compared our findings with World Bank's knowledge economy indices. The Knowledge Economy Index (KEI) provided by the World Bank takes into account whether the environment is conducive for knowledge to be used effectively for economic development. The KEI score an aggregate index that represents the overall level of development of a country towards the Knowledge Economy. The index is calculated based on the average of the normalized performance scores of a country on all 4 pillars - economic incentive and institutional regime, education and human resources, the innovation system and information and communications technology (ICT). In making the KEI indices, World Bank considered 3 key variables for economic incentives and institutional regimes tariff and nontariff barriers, regulatory quality and rule of law. These three key variables are found to be the most significant variables for each pillars of knowledge-based economy for all the countries of world.

For economic incentives and institutional regimes, we found that tariff and nontariff barriers, business freedom, investment environment, monetary system, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption are highly significant. If we look at the World Bank's three variables for this pillar, we realize that all three are found significant for economic incentives and institutional regimes in East Asia.

12. Tracking the Relationship between the Key Determinants of KBE and East Asia's Overall Development

The purpose of creating knowledge-based economy is to have a globally strong and competitive economy to maintain sustainable economic growth towards overall development of a country. The East Asian economies have been pursuing necessary policies to create knowledge-based economy in order to continue their economic development in the post-industrial era and to be globally competitive. In doing so, some economies in the region

became exceptionally successful in creating a functional knowledge-based economy while some others are behind. Countries like Japan, Korea, Taiwan, Hong Kong and Singapore have shown remarkable achievements in creating a successful knowledge-based economy. To understand the development trend in the East Asian knowledge-based economies, we did not investigate the GDP growth because the bigger the economy grows, the lower the GDP growth rate becomes although the absolute value of GDP is always higher in the advanced countries. For this reason, we considered the human development index (HDI), which is a composite measure of three components: longevity (measured by life expectancy); knowledge (adult literacy rate and mean years of schooling); and standard of living (real GDP per capita in purchasing power parity) to understand the development pattern in the East Asian knowledge-based economies. HDI provides information on the human development aspect of economic growth.

Table 4 shows the HDI for the East Asian economies for the year 1980, 1985, 1990, 1995, 2000, 2005, 2006, and 2007. From the table, we observe that there has been a positive growth trend of human development in all the economies of East Asia while the advanced knowledge-based economies achieved incredible success in this regard which can be compared with the most advanced nations of the world. From this finding, it is obvious that most of the East Asian economies have achieved excellent growth in life expectancy, adult literacy rate and mean years of schooling, and real GDP per capita in purchasing power parity.

Table 4
Human Development Index Trends in East Asia

Country	1980	1985	1990	1995	2000	2005	2006	2007
China	0.533	0.556	0.608	0.657	0.719	0.756	0.763	0.772
Hong Kong	N/A	N/A	N/A	N/A	N/A	0.939	0.943	0.944
Indonesia	0.522	0.562	0.624	0.658	0.673	0.723	0.729	0.734
Japan	0.887	0.902	0.918	0.931	0.943	0.956	0.958	0.960
Korea	0.722	0.760	0.802	0.837	0.869	0.927	0.933	0.937
Malaysia	0.666	0.689	0.737	0.767	0.797	0.821	0.825	0.829
Philippines	0.652	0.651	0.697	0.713	0.726	0.744	0.747	0.751
Singapore	0.785	0.805	0.851	0.884	N/A	N/A	0.942	0.944
Taiwan	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.943
Thailand	0.658	0.684	0.706	0.727	0.753	0.777	0.780	0.783

Source: Human Development Report 2009 available at http://hdrstats.undp.org/en/indicators/81.html and http://www.dgbas.gov.tw/public/Data/910616273671.pdf for Taiwan's data

We, then, investigated the correlations between the key determinants of economic incentives and institutional regimes of knowledge-based economy in East Asia from our findings with HDI. Table 5 shows the correlation of each determinant with the HDI. From the correlation analysis, we can see that the correlations of all the determinants of economic incentives and institutional regimes with HDI are highly significant at 0.01 level except for tariff and nontariff barriers (See Table 5). This indicates that the determinants factors of economic incentives and institutional regimes of East Asian knowledge-based economies have very close positive relationship with overall human development.

Table 5
Correlations

		Economic Incentives and Institutional Regimes								
		Tariff and Nontariff	Business Freedom	Investment Environment	Monetary System	Political Stability	Government Effectiveness	Regulatory Quality	Rule of Law	Control of Corruption
Human Development Index	Pearson Correlation	.576	.840**	.857**	.862**	.917**	.878**	.910**	.932**	.907**
	Sig. (2-tailed)	.081	.002	.002	.001	.000	.001	.000	.000	.000
	N	10	10	10	10	10	10	10	10	10
	**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).									

13. Concluding Remarks

Through qualitative discussions and empirical data analysis, the key factors of economic incentives and institutional regimes became very evident for the selected East Asian countries. From the analysis in the above sections, we also found that there has been a very positive growth trend of most of the factors of economic incentives and institutional regimes in the East Asian countries. In their pursuit of becoming knowledge-based economy in East Asia, some countries performed extraordinarily well while some countries are still in way of development.

In terms of economic incentives and institutional regimes, we found openness, supporting business environment, suitable business environment, functional monetary system, sound financial system, and property rights protection have been the key factors of the economic incentives in the East Asian countries while in terms of institutional regimes, voice and

accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption are the key factors identified. However, from statistical analysis we discussed in section 7, it is evident that not all the factors that are mentioned and discussed in section 2-6 are equally significant for creating better economic incentives and institutional regimes for a knowledge-based economy. From the statistical analysis we identified the key determinants of economic incentives and institutional regimes in East Asia and they are tariff and nontariff barriers, business freedom, investment environment, monetary system, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption.

Our objective in this paper was to investigate the key determinants of economic incentives and institutional regimes in East Asia to promote knowledge-based economy in the region. From the analysis, it is clear that there are some key determinants of economic incentives and institutional regimes in the successful East Asian knowledge-based economies. Overall, in all the selected East Asian countries, the economic incentives and institutional regimes are playing very important role in promoting knowledge-based economy in the region.

REFERENCE

Brusoni, S., Prencipe, A. and Pavitt, K. (2000). Knowledge Specialization and the Boundaries of the Firm: Why Do Firms Know More Than They Make? *Administrative Science Quarterly,* 46, pp. 597-621.

Chen, D. H. C. and Dahlman, C. J. (2005). The Knowledge Economy, the KAM Methodology and World Bank Operations. The World Bank, Washington DC, 19 October, 2005.

Etzkowitz, H. and Leydesdorff, L. (1998). The Endless Transition: A "Triple Helix" of University-Industry-Government Relations. *Minerva*, 36, 203-208.

Freeman, C. (1982). *The Economics of Industrial Innovation.* Penguin: Harmondworth.

Galbraith, J. K. (1967). *The New Industrial State*. Penguin: Harmondsworth.

Heritage Foundation. (2009). 2009 Index of Economic Freedom. Available at http://www.heritage.org/index/PDF/2009/Index2009_Chapter1.pdf.

Heritage Foundation 2009 Online available at http://www.heritage.org/index/Ranking.aspx.

Irvine, J. and Martin, B. R. (1984). *Foresight in Science: Picking the Winners.* London: Frances Printer.

Knowledge Economy Forum (2002). *Building Knowledge Economies: Opportunities*

and Challenges for EU Accession Countries. Paris, February 19-22.

Kaufmann, D., Kraay, A. and Zoido-Lobatón, P. (1999a). Aggregating Governance Indicators. *World Bank Working Paper,* No. 2195, available at: http://www.worldbank.org/wbi/governance.

Leydesdorff, L. (2005). *The Knowledge-based Economy: modeled, measured, simulated*. Boca Raton, Fla.: Universal Publishers.

McLean, B. and Shrestha, S. (2002). International financial liberalization and economic growth. *Research Discussion paper*, available at http://www.rba.gov.au/PublicationsAndResearch/RDP/RDP2002-03.html, accessed 14 November, 2008.

OECD (1980). *Technical Change and Economic Policy*. Paris.

UNCTAD. (2007). Science and technology for development: the new paradigm of ICT. *Information Economy Report 2007-2008*, New York and Geneva.